APPLICATION NO. 09/826,118

INVENTION: New Wavelet Multi-Resolution Waveforms

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ABSTRACT OF THE DISCLOSURE

Design of multi-resolution waveforms and filters in the frequency domain with a property which provides a single waveform design for all of the waveforms at multiple scales. These waveforms and filters are Wavelets designed to meet the specific application requirements, are complex, are defined by frequency harmonics, and include a frequency translation. Frequency design harmonics and the frequency translation capability enable the waveform at multiple scales to be derived from the waveform design by scaling the dilation, translation, and frequency translation parameters. Wavelet waveform design is illustrated by Matlab 5.0 code to design a linear filter waveform using an iterative least-squares eigenvalue approach to minimize the non-linear least-squares cost function, and to scale this waveform design for multi-resolution application specified by the dilation, time translation, and frequency translation parameters. Additional results are given for a constant amplitude minimum-shift-keying bandwidth-efficient modulation waveform and for a synthetic aperture radar waveform.